(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number **0 080 793**
A1

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **82304388.0**

(22) Date of filing: **19.08.82**

(51) Int. Cl.³: **A 61 M 5/20**
A 61 M 5/315, A 61 M 5/32

(30) Priority: **12.11.81 US 320551**

(43) Date of publication of application:
08.06.83 Bulletin 83/23

(84) Designated Contracting States:
AT BE CH DE FR GB IT LI LU NL SE

(71) Applicant: **Jacklich, John Joseph**
102 Western Court
Santa Cruz California 95060(US)

(72) Inventor: **Jacklich, John Joseph**
102 Western Court
Santa Cruz California 95060(US)

(74) Representative: **Bayliss, Geoffrey Cyril et al,**
27, Furnival street
London, EC4A 1PQ(GB)

(54) **A dental syringe.**

(57) A compact anesthetic syringe is disclosed for injecting a medication under high pressure into a confined space comprising a lower cylinder (15) to receive a carpule (35) containing a medication and having a cannula assembly (27) at one end which penetrates the carpule. An upper cylinder (17) contains a piston rod (69) having a piston (43) which engages in the carpule. The piston rod has ratchet teeth (61) and a lever (11) pivotally mounted on the upper cylinder and a spring biased away from the cylinder has a ratchet (57) engaging the teeth. Depressing the lever (11) towards the cylinder causes the piston rod to force the piston into the carpule to eject the medication from the cannula. The arrangement provides a compact device which is simple to hold and operate in one hand and a stroke of the lever discharges a known amount of liquid.

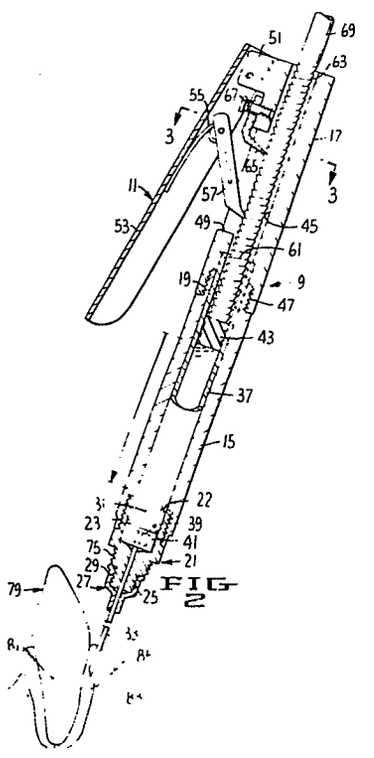


FIG 2

EP 0 080 793 A1

"A DENTAL SYRINGE"

It is frequently necessary to inject a medication at a relatively high pressure into the human body and particularly into the dental periodontal ligament. A very fine needle must be used and that high pressure is required to force the medication into the tissues.

In the past rather cumbersome devices have been employed which were awkward for the dentist to use which required a great deal of manual dexterity and, because of the rather large size and formidable appearance of the instruments, had a tendency to scare the patients.

The invention provides a dental syringe comprising in combination:

a. a cylindrical chamber for containing a medication,

b. An actuating lever lying adjacent to said cylinder near the proximal end thereof and being pivoted thereto, said lever being biased outwardly to a first position at an acute angle to said chamber and being movable to a second position parallel to said chamber,

c. a piston rod movable within said chamber, said rod having a plurality of ratchet teeth thereon,

d. a ratchet pivoted to said operating handle and extending into said chamber in operative relationship with said ratchet teeth,

e. a detent biased into said ratchet teeth to permit said piston rod to move into said cylinder and to prevent reverse motion,

f. a cannula extending from the opposite end of said cylindrical chamber whereby:

g. movement of said operating arm will cause said piston rod to move into said chamber and to discharge liquid from said chamber out through said cannula.

The syringe can be constructed so that only a relatively slight movement is necessary to actuate the syringe so that the device is capable of exerting a high pressure with little movement by

the operator so that the operator can concentrate on getting the medication into the proper place rather than the operation of the syringe. Further, the syringe may be calibrated, so that each movement of the injection lever will discharge a known amount of liquid.

The syringe can also be constructed to fit within the hand of the dentist so that it is comfortable and natural to "aim" the device at a precise location. One may hold the device as one holds a pencil or it may be held between the thumb and palm, both of which are comfortable operating positions.

Other features and advantages of the invention will be brought out in the balance of the specification.

In order that the present invention may more readily be understood the following description is given, merely by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view showing an instrument embodying the present invention in use.

Figure 2 is an enlarged view of the instrument, partly in section, showing it in use.

Figure 2A shows how the device can be used with a bulk medication.

Figure 3 is a section on the line 3-3 showing the different parts of the instrument:

Figure 4 is an exploded view of the instrument.

Figure 5 shows how the device may be used with an angle discharge device.

Figure 6 is a perspective view of a prior art device.

Referring now to the drawings by reference characters, the device of the present invention is generally designated 7 and, as can be seen best in Figs. 1 and 2

consists of a central tubular portion 9 and an operating handle 11. In Fig. 1 the device is shown being held in the palm of a hand 13 with the operating lever 11 being operated by the thumb.

The tubular portion 9 consists of a lower cylinder 15 and an upper cylinder 17 connected together by means of the threads 19.

At the distal end of the cylinder 15 is a nosepiece 21 which has external threads 23 for attaching it to the lower cylinder 15 and a second set of threads 25 which may be used for attaching it to the cannula assembly 27. The nosepiece 21 has a smooth, cylindrical inner surface 22 which serves to hold the end of a carpule 35, later described. The cannula assembly 27 includes a hub 29 with internal threads to mate with the threads 25. This holds the double ended cannula proper which has short end 31 which is adapted to extend into the nosepiece 21 and a longer external end 33 which is used for the actual injection of the medicine.

The device of the present invention is primarily adapted for use with a carpule 35 which consists of a glass cylinder 37, a fixed end portion 39, which is adapted to be penetrated by the short end 31 of the cannula and a metal shoulder 41. At the opposite end is a resilient piston-like member 43 which can be pushed into the cylinder 37 to discharge a medication contained therein.

The upper portion 17 of the cylinder 9 is generally round on the outside with a central passage 45 and with internal threads 47 near the bottom to mate with threads 19. Part 17 has a slot 49 at one side thereof and also has a lug 51 which extends outwardly just above the slot and the operating handle 53 is pivoted on this lug. A spring 55 normally biases the handle 53 outwardly. A ratchet 57 is pivoted on handle 53 and the same spring 55 biases ratchet 57 into the groove 49 as is best seen in Fig.2.

A piston rod 61 extends into the opening 45 and the piston rod has a number of ratchet teeth 63. It will be noted that the ratchet teeth are substantially flat on one side and set at an angle on the opposite side so that the ratchet 57 can actuate the rod effectively. The teeth may be separate parallel teeth or in the form of a continuous spiral thread around the rod. A pawl 65 is urged by spring 67 into contact with the ratchet teeth. Now it is obvious that as the handle 53 is worked back and forth, the piston rod 61 will advance into the cylinder and pawl 65 will prevent return motion. It will press downardly upon the plug portion 43 of the carpule forcing the contents of the carpule out through cannula 33. By properly selecting the size of the ratchet teeth and the movement of the operating arm 53, each movement of the arm 53 will inject a known and measured quantity of the liquid from the carpule.

Although the device of the present invention is designed primarily to be used with a carpule, it may be

also used with a bulk medication, as is shown in Fig. 2A, in which case it would only be necessary for the cannula to extend out from the nosepiece 21 and one would insert a small, inert, compressible ball 24 above the bulk liquid 26 to be dispensed, the ball serving as a piston to seal and discharge the contents.

It will be noted that the portion of the piston rod 61 near the proximal end is unthreaded as at 69. The reason for this is that the length of the threaded portion is selected so that it will completely discharge the contents of the carpule but go no farther. With some prior art devices which do not have this limiting scheme, it was possible to keep pressing on the actuating lever after the contents had been completely discharged from the device, breaking the carpule and making it difficult to remove the pieces and clean.

Fig. 5 shows a refinement of the invention wherein a relatively stiff metal tube, curved at an appropriate angle, and designated 71 is attached to a threaded holder 73 which has internal threads adapted to mate with a third set of threads 75 on nosepiece 21. It is frequently necessary to inject a medication at an angle through the device and ordinarily needles such as 33 are flexible enough so that they can be turned. However, they have very little strength so that one cannot exert any substantial pressure on inserting the needle at an angle. Utilizing the stiff tube 71, the cannula will

extend through the tube with the help of the tunnel-like portion 72, following the angle of the tube, and be reinforced so that a substantial amount of force can be placed on the cannula even when it is at a right angle to the tubular member.

The tubular portion 22 of nosepiece 21 is of sufficient length so that when the device is disassembled, the exhausted carpule will be retained by the nosepiece from which it is easily removed. However, should it stick in cylinder 15, one can easily ram it out.

Many departures can be made from the exact structure shown without departing from the spirit of this invention. For example, instead of separate ratchet teeth 63 on the piston rod 61, the teeth 63 may be provided by a continuous thread wound around the rod 61. The rod 61 can then be removed by turning.

CLAIMS:

1. A dental syringe comprising in combination:
   a. a cylindrical chamber for containing a medication,
   b. an actuating lever lying adjacent to said cylinder near the proximal end thereof and being pivoted thereto, said lever being biased outwardly to a first position at an acute angle to said chamber and being movable to a second position parallel to said chamber,
   c. a piston rod movable within said chamber, said rod having a plurality of ratchet teeth thereon,
   d. a ratchet pivoted to said operating handle and extending into said chamber in operative relationship with said ratchet teeth,
   e. a detent biased into said ratchet teeth to permit said piston rod to move into said cylinder and to prevent reverse motion,
   f. a cannula extending from the opposite end of said cylindrical chamber whereby:
   g. movement of said operating arm will cause said piston rod to move into said chamber and to discharge liquid from said chamber out through said cannula.

2. The syringe of claim 1 having a nosepiece at the distal end, said nosepiece being adapted to hold a double cannula with one end extending into the chamber and the other end extending outwardly.

3. The syringe of claim 1 or claim 2 wherein said nosepiece is adapted to retain a carpule within said chamber.

4. The syringe of any of the preceding claims wherein said chamber is made of two separate tube parts.

5. The syringe of any of the preceding claims wherein the proximal end of said piston rod is smooth and the distal end only has ratchet teeth whereby the movement of said piston rod is limited to prevent air from being forced to the distal end of said chamber.

6. In an anaesthetic syringe in accordance with any of the preceding claims, a stiff tube extending around said cannula and terminating short of the end, said tube being bent at an angle to said cannula whereby said tube reinforces said cannula.

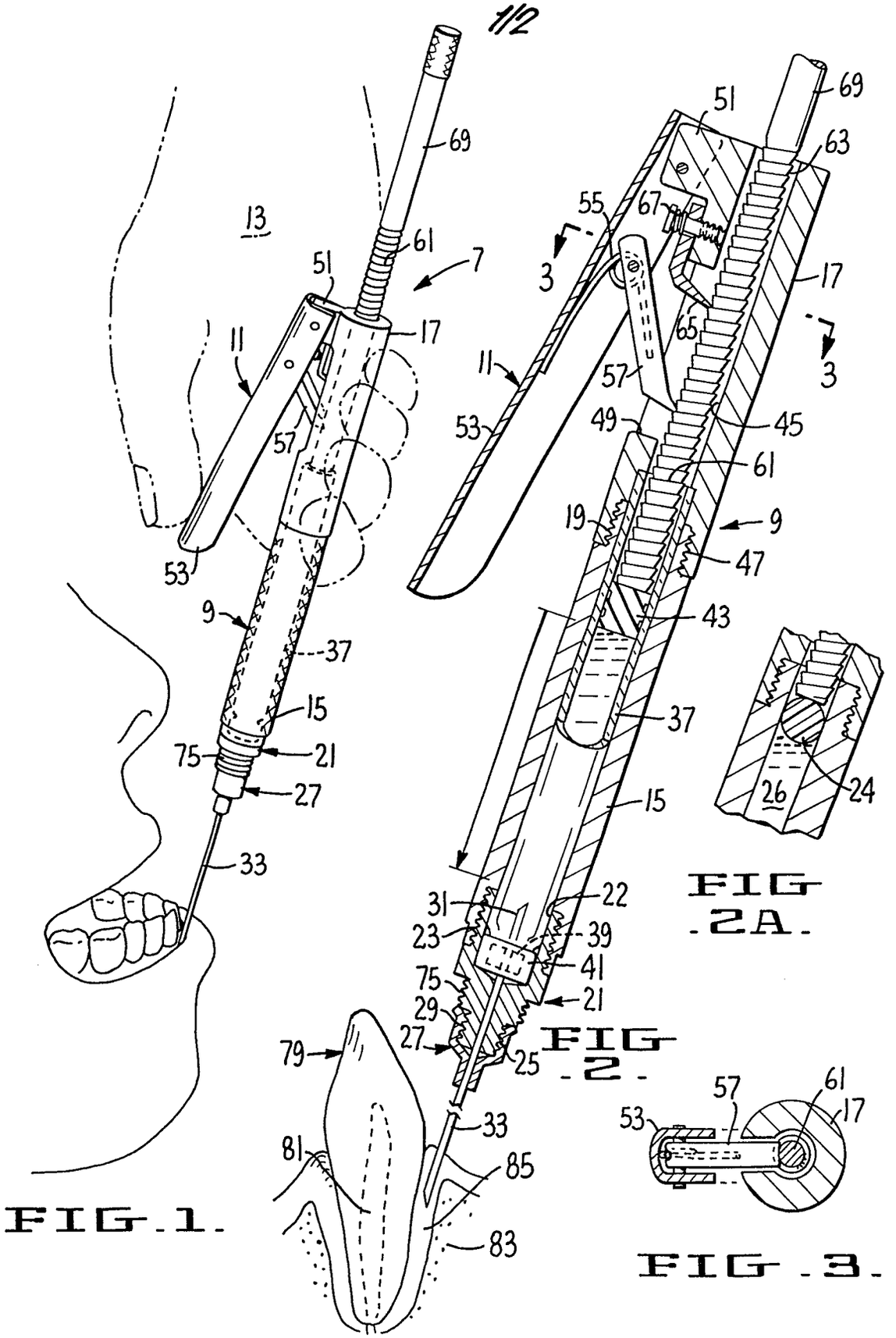


FIG-1.

FIG-2.

FIG-2A.

FIG-3.

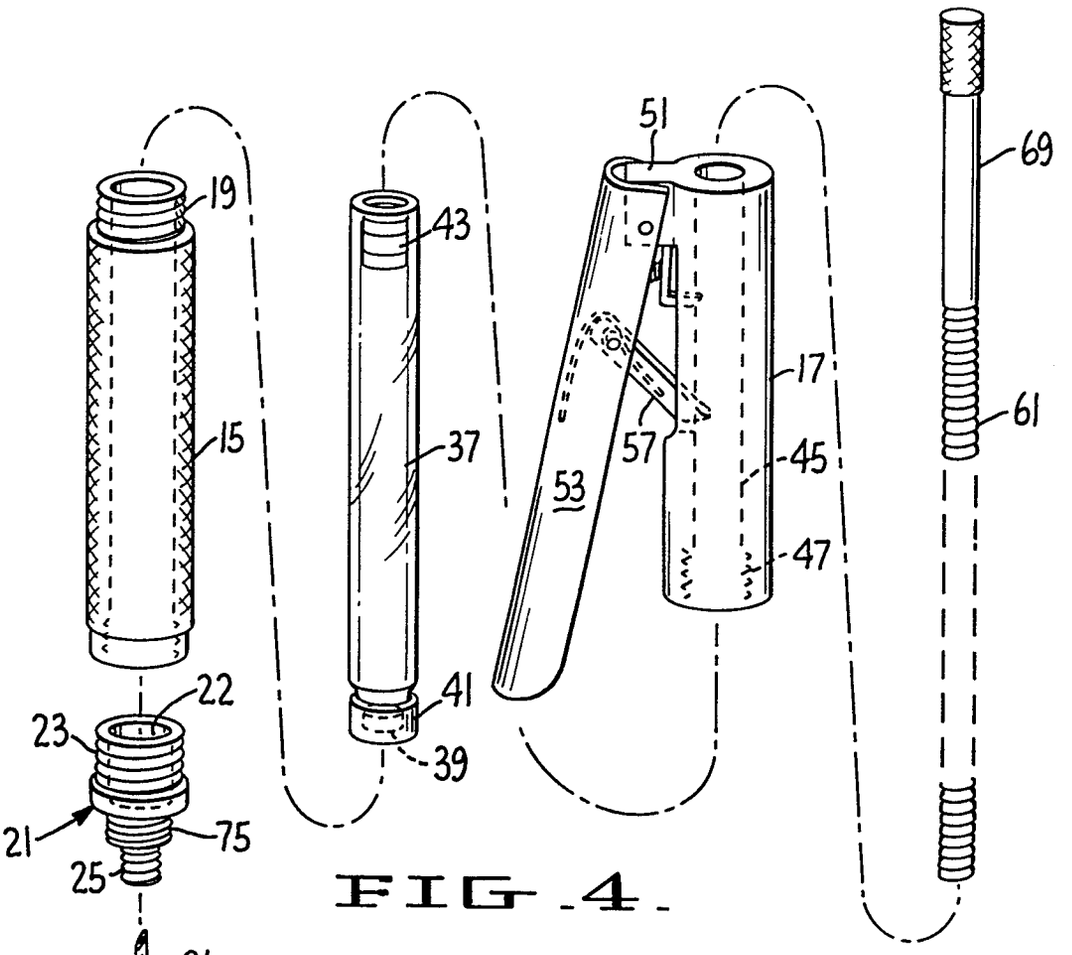


FIG. 4.

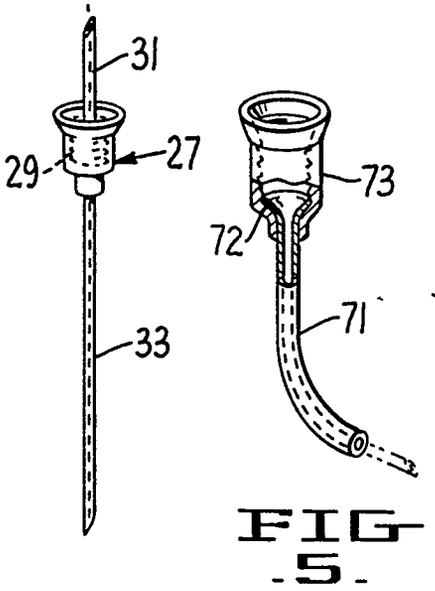


FIG. 5.

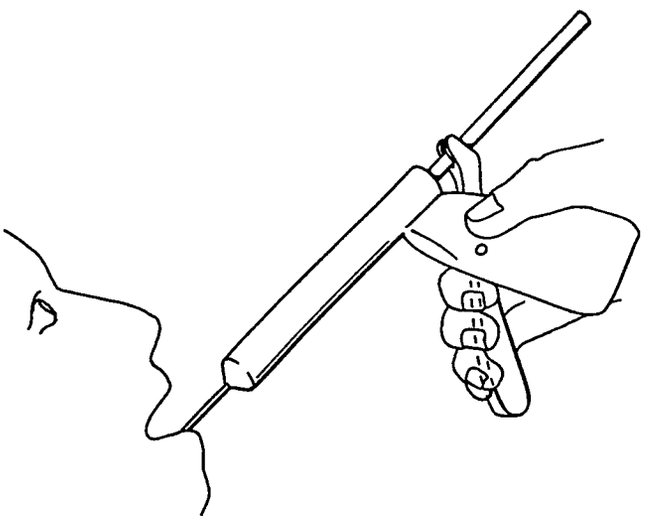


FIG. 6.

European Patent Office

EUROPEAN SEARCH REPORT

Application number

EP 82 30 4388

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int Cl ³)
X,Y	AT-B- 212 625 (H. HAUPTNER) * Page 2, lines 7-9, 16-27, 33-39, 45-47; figure s 1, 4 *	1-4,6	A 61 M 5/20 A 61 M 5/315 A 61 M 5/32
Y	FR-A-2 480 126 (M. MORVAN) * Claims 1, 2; page 4, lines 20-25 *	2-4	
Y	FR-A- 476 918 (SCHIMMEL) * Abstract; Figure *	6	
Y	CH-A- 351 708 (H. HAUPTNER) * Page 1, lines 50-74; page 2, lines 1-10; Figure *	1,3	
Y	US-A-3 517 668 (BRICKSON) * Claim; Figure *	1,3	TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
A	DE-C- 730 971 (H. HAUPTNER) * Figure *	1	A 61 M 5/20 A 61 M 5/31 A 61 M 5/32
A	FR-A- 819 629 (C. JORIOT) * Page 2, lines 76-83 *	5	
A	DE-C-1 053 143 (J. KOCH) * Column 2, lines 42-45 *	5	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	31-01-1983	CLOT P.F.J.

CATEGORY OF CITED DOCUMENTS

X particularly relevant if taken alone
Y particularly relevant if combined with another document of the same category
A technological background
O non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E earlier patent document, but published on, or after the filing date
D document cited in the application
L document cited for other reasons

& member of the same patent family, corresponding document

EPO Form 1503 03 82